SOVIET TANKS AT KURSK 1943

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NEW VANGUARD 335

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SOVIET TANKS AT KURSK 1943

INTRODUCTION

Theater-wide offensives were beyond Germany's resources after the disaster at Stalingrad, but Hitler sought to begin the 1943 summer campaigning season with a victory to restore prestige and keep his allies in line. The Kursk salient was selected for concentric attacks to cut off and destroy two Soviet fronts, shorten German lines, and it was hoped, signal to the world that the Wehrmacht was still able to dominate the Red Army during the summer months. The forewarned Soviets built deep defensive zones with minefields, dug-in infantry, and antitank guns to meet the German attack, but it ultimately fell to the Red Army's tank reserves to check the assault. In mid-1943, Soviet forces were equipped with T-34s, T-70s, and Lend-Lease tanks now matched or exceeded in armor and firepower by the Wehrmacht's up-gunned PzKpfw IVs and new Panthers and Tigers. In the end, improved Soviet organization and doctrine for armored operations along with the USSR's ability to continuously rebuild its forces with replacement tanks and crews allowed Stalin's tank armies to halt the last major German offensive on the Eastern Front and launch its own attacks against Orel and Kharkov. Joined in 1944 by upgraded T-34/85s, IS-2 heavy tanks, and SU-85 and SU-100 self-propelled guns (SPGs), the tank armies that fought at Kursk would battle across Eastern Europe and destroy the Nazi regime in the ruins of Berlin in May 1945.

ORGANIZATION AND DOCTRINE

Doctrine and force structure

The Red Army fielded five tank armies, 20 tank and 11 mechanized corps, 120 tank brigades, and 91 tank regiments in early 1943. The tank park amounted to 20,600 tanks, with over half either T-60 or T-70 light tanks or Lend-Lease models, along with about 2,000 KV heavy and 7,600 T-34 medium tanks. Some armor units were stationed in the Far East or interior military districts, but around 14,000 were at or near the front, with 7,000–8,000 operational.

The key Red Army formation for armored warfare was the tank army, a force roughly comparable in size to the German Panzer korps. Soviet offensive doctrine called for infantry armies supported by attached tank brigades and

regiments to breach enemy defenses with the support of massive artillery barrages. At the right moment, front headquarters would send separate tank corps or full tank armies to exploit the breach and strike into the enemy's operational depths. Soviet defensive doctrine called for the infantry armies to absorb and delay an enemy attack while tank corps or tank armies stood ready 30–50km to the rear to counterattack any enemy breakthrough. Capable leadership and staff work at the front, army, and corps levels was vital to properly time and control the commitment of tank corps and armies during both counterattacks and offensives.

76mm-armed T-34 Model 1943s advance carrying their tank-riding infantry. The T-34 was the critical Soviet tank at Kursk, as was true throughout the Great Patriotic War, making up about 62 percent of the Red Army tanks engaged in the defense of the salient. (Photo by Sovfoto/Universal Images Group via Getty Images)

The Red Army formed ad hoc tank armies as early as 1942, but these poorly organized forces were rapidly shattered in a series of counterattacks against Army Group South in the summer of 1942. Despite successfully encircling the exposed German 6th Army at Stalingrad, the early Red Army tank armies were again defeated by von Manstein's backhand blow counteroffensive in early 1943. The 1942 tank armies usually contained mixes of rifle and cavalry units in addition to tank and mechanized corps, and lacked sophisticated army-level support units. Soviet commanders struggled to direct the variety of mechanized, infantry, and cavalry units under their control at any one time, and the rifle and cavalry divisions could not keep up with the tank corps during offensives. As a result, in January 1943, the Soviet high command created a new table of organization for the tank army, which would now be purely composed of tank or mechanized corps along with standardized support units. Five tank armies were in operation during the summer of 1943, with three committed to defend Kursk and two joining in Operation *Kutuzov* against the Orel salient. Although their strength varied given the different mixes of tank or mechanized corps under command at any one time, full-strength tank armies typically contained roughly 40,000 troops and 400 to 600 tanks and SPGs.

A formation of KV-1S tanks during the Kursk campaign complete with ceremonial colors. By the summer of 1943, the Soviets had improved the organization of their armored forces as well as the doctrine for their employment in offensive and defensive operations. (Photo by Laski Diffusion/Getty Images)

Tank corps were the equivalent of German Panzer divisions and provided the armored punch for Red Army offensives. Tank corps could be subordinated to a tank army or separately held directly under front control. First organized in early 1942, the tank corps initially consisted of two tank brigades along with a motorized rifle brigade and minimal support elements. The number of tank brigades was soon increased to three and supporting arms were quickly strengthened. Signals, engineer-mine, and reconnaissance companies were all expanded to battalions, and a mortar regiment with 36 truck-carried 120mm mortars was added in early 1943. Specialized defensive units also joined the corps' organization, including an antitank regiment with 76.2mm divisional or 57mm ZiS-2 antitank guns, along with an antiaircraft regiment. Six of the 12 tank corps that fought at

Soviet infantry and tanks, late 1941. After the massive losses suffered in the early months of the year, the Red Army's tank force was reduced to operating in small mixed brigades with KV heavy, T-34 medium, and T-60 light tanks in an infantry support role. (Photo by Sovfoto/Universal Images Group via Getty Images)

Kursk contained an additional antitank battalion with 12 85mm antiaircraft guns added to improve capabilities against the heavily armored German Tiger Is. Like the famous German 88mm antiaircraft gun, the Soviet 85mm was extremely effective against armored vehicles. After Kursk, the battalion was removed as new SU-85 and more SU-152 self-propelled gun regiments became available and were assigned to the tank corps, followed in early 1944 by the arrival of the new T-34/85. By mid-1943, tank corps' tank brigades each contained 32 T-34 and 21 T-70 tanks organized into a medium and a light tank battalion, three armored cars in a reconnaissance platoon, and a motorized rifle battalion with infantry typically carried on the tank decks.

While well organized for exploitation and pursuit operations, the tank corps lacked the battalions of indirect-fire artillery found in the German Panzer division that gave the later unit the ability to perform a wider variety of offensive and defensive missions. The USSR lacked the sophisticated radio equipment and trained personnel needed to rapidly call down fire in a fluid, dynamic situation. Even had the means been available, Soviet military culture favored centralized command and detailed planning rather than empowering subordinates to call in fire in rapidly changing environments. As a result, the Red Army concentrated most of its indirect-fire artillery in separate brigades and divisions used for the massive pre-planned barrages that began Red Army offensives.

A

T-34 MEDIUM TANKS

1. 76mm-armed T-34 Model 1943, 5th Guards Tank Army, Prokhorovka. The Model 1943 was the most common T-34 type employed during the Kursk campaign. The 1943 version had a new hexagonal turret with more room, allowing the rounds carried to be increased from 77 to 100. Welded handlebars were added to the sides of the tank and turret to help the Soviet infantry tank riders to mount and remain on the vehicle as it advanced across country. The two 40-liter fuel containers are visible on the back of the tank. Like the more familiar fuel drums on the rear sides of Soviet tanks, these were not directly connected to the fuel system, and had to be pumped into the tank by the crew. This T-34 has logs to be used for unditching attached to the tank's sides. Like most Soviet World War II tanks, this T-34 is painted the standard 4BO dark green.

2. 76mm-armed T-34 Model 1942, 38th Tank Brigade. In addition to the more modern Model 1943, large numbers of surviving Model 1942s remained in the Soviet order of battle at Kursk. The Model 1942 was a simplified version of the earlier T-34 design adopted to maximize tank production during the dark days of 1941–42. The model had a large, forward-opening two-man turret hatch which exposed any tank commander trying to operate with his head out of the turret for better situational awareness. There were no standard tactical markings on Red Army tanks during the war due to security concerns, although they were often added for specific operations as directed by individual unit commanders, often to assist with traffic control. Red Army tank crews were, however, encouraged to paint patriotic slogans on their tanks, and this one has the phrase "for the homeland" on the turret.

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With only 15 small infantry companies in total and limited organic fire support, the tank corps struggled to hold ground once an attack lost momentum. In response, the Red Army began to form new mechanized corps in September 1942. These units shared similar fire support, engineer, and reconnaissance elements with the tank corps, but consisted of three mechanized infantry brigades, each with three rifle battalions with organic truck transportation, along with a 39-tank armored regiment. In 1943, mechanized corps also contained either two additional tank regiments or one to two tank brigades. Overall, the mechanized corps was a more balanced organization than its tank corps partner but required large numbers of highly trained specialist personnel and scarce transportation and communications equipment, and only 14 were ultimately fielded.

Soviet tank and mechanized corps at Kursk, July 1, 1943

	Tank brigades	Motorized rifle or mechanized brigades	Total tanks and SPGs
Voronezh Front			
6th Tank Corps/1st Tank Army	22, 112, 200	6	233
31st Tank Corps/1st Tank Army	100, 237, 242	None	202
3rd Mechanized Corps/1st Tank Army	1G*, 49	1, 3, 10 Mechanized	229
2nd Guards Tank Corps	4G, 25G, 26G	4G	187
5th Guards Tank Corps	20G, 21G, 22G	6G	211
Central Front			
3rd Tank Corps/2nd Tank Army	50, 51, 103	57	204
16th Tank Corps/2nd Tank Army	107, 109, 164	15	220
9th Tank Corps	23, 95, 108	8	168
19th Tank Corps	79, 101, 102	26	168
Reinforcements			
2nd Tank Corps	26, 99, 169	58	168
10th Tank Corps	178, 183, 186	11	185
18th Tank Corps/5th Guards Tank Army	110, 170, 181	32	202
29th Tank Corps/5th Guards Tank Army	25, 31, 32	53	223
5th Guards Mechanized Corps/5th Guards Tank Army	24G	10G, 11G, 12G Mechanized	229

*Guards

The Soviets did not have organic tank support with their rifle divisions, but infantry armies earmarked for important offensive or defensive operations typically had separate tank brigades or regiments attached. Infantry support tank brigades contained three 21-tank battalions and totaled 65 tanks, while the separate regiments had three medium and one light tank company, giving a total of 39 tanks. To deal with enemy fortifications, the Soviets formed their KV-1 tanks into 21-strong separate heavy tank regiments.

Soviet riflemen riding a T-34. Red Army tank and mechanized corps were chronically short of trucks, and the tanks were typically used to transport infantrymen. (Photo by Picture Post/Hulton Archive/Getty Images)

Infantry army armored support at Kursk, July 1, 1943

	Tank brigades	Tank regiments	Tanks and SPGs
Central Front			
48 Army		45, 193, 299	178
13 Army	129	27G, 30G, 43, 58, 237	270
70 Army		240, 251, 259	125
65 Army		29G, 40, 84, 255	124
60 Army	150		67
Voronezh Front			
38 Army		180, 192	150
40 Army	86	59, 60	119
6 Guards Army	96	230, 245	150
7 Guards Army	27G, 201	148, 167, 262	239
69 Army			none

Training and tactics

Tank units wasted away rapidly in combat, forcing the Red Army to continually replenish the force with replacement tanks and fresh crews. Devastating losses in 1941 and 1942 had compelled the Soviets to repeatedly rebuild units from the ground up, but by 1943 enough commanders and crews had survived the winter campaign to give rebuilt units a core of experienced personnel. Soviet tank training was rudimentary, increasing the importance of the cadre of experienced personnel. Tank crew training largely consisted of repetitive drills, with loaders repeatedly loading dummy main gun rounds and replacing the drums on the coaxial machine guns, while radiomen were only trained to turn on and tune the sets. Drivers were given cursory familiarity with the engine, starting the tank, and driving in column or wedge formation. Gunners often only fired a total of three live rounds and were not trained to lead a moving target. Tank optical sights were often unaligned with the main gun as the gunners were not trained in bore sighting

A tank unit prepares for operations during the Stalingrad campaign. The Soviets employed motorcycle and armored car battalions as reconnaissance elements in their tank and mechanized corps. (The Dmitri Baltermants Collection/Corbis via Getty Images)

techniques, an aspect of gunnery that the Germans heavily emphasized both in training and in the field. Soviet crew training culminated in a simple "tank platoon in the offensive" exercise with platoons or companies driving in formation towards a hypothetical enemy position. The rudimentary training given new Soviet crews was matched by a tactical doctrine which focused heavily on attacks in formation, with the tanks directed to fire on the move in the general direction of the enemy. German tank crew training was much more sophisticated and included cross-training crewmen to fill other positions, gunnery training on ranges with pop-up targets, and instruction on operating under enemy fire and maneuvering to best use terrain.

The Soviet tank force at Kursk

The Kursk salient was defended by General Konstantin Rokossovsky's Central Front to the north and General Nikolai Vatutin's Voronezh Front to the south. At the start of *Zitadelle*, Rokossovsky had 1,413 tanks and 104 SU self-propelled guns, and Vatutin 1,444 and 54. Each front contained a tank army, General Aleksi Rodin's 2nd with over 400 tanks under Rokossovsky, and General Mikhal Katukov's 1st with over 600 tanks under Vatutin. Rokossovsky could also call on two subordinate separate tank corps, the

Soviet tank crews in training, 1942. The Red Army's tank training program failed to prepare its crews for effective operations, typically only drilling the new crews on basic tasks. German panzer crews, in contrast, received extensive gunnery training, including engaging pop-up targets on training courses as well as extensive exercises in how to maneuver under combat conditions. (Wikimedia Commons/Public domain)

9th and 19th, for support, and Vatutin similarly had the 2nd and 5th Guards Tank Corps under direct command. The two fronts also controlled a total of 12 infantry armies, with attached armored support including six separate tank brigades and 24 separate tank regiments.

Soviet tank strengths at Kursk

Front	T-34	T-70/60	KV	M3M Lee	M3L Stuart	Matilda or Valentine	Churchill	Total
Central	851	239/135	75	85	9	19	0	1,413
Voronezh	946	277/25	34	24	54	47	37	1,444
Steppe*	584	335/0	1	0	0	0	41	961
Total	2,381	851/160	110	109	63	66	78	3,818

*Forces engaged during *Zitadelle*

During the defense of the salient, the Voronezh Front was heavily reinforced in response to Army Group South's steady advance. The Soviet high command sent the 2nd Tank Corps from the Southwestern Front and the 10th Tank Corps from General Ivan Konev's reserve Steppe Front to support Vatutin in the early days of the offensive. By July 12, General Pavel Rotmistrov's 5th Guards Tank Army from the Steppe Front would be in place to launch a major counterattack against the deepest German penetration of Soviet defenses just south of the village of Prokhorovka. Ultimately, the Red Army would dedicate all five of its tank armies, controlling 12 tank and four mechanized corps to the defensive operation at Kursk and the subsequent *Kutuzov* and *Rumyantsev* counteroffensives.

Over a quarter of the Soviet armored force at Kursk was made up of obsolete T-60 and severely overmatched T-70 light tanks as the USSR was unable to completely fill its armored organizations with 76mm-armed T-34 medium tanks after the heavy losses of 1942. During the Kursk fighting, about ten percent of the Central and Voronezh tank force was made up of Lend-Lease types, including US M3S Lee medium and M3L Stuart lights as well as British Matildas, Valentines, and Churchills. In 1943, Lend-Lease tanks in Soviet service were generally used in the tank brigades and regiments attached to the infantry armies, although the Voronezh Front's separate 2nd Guards and 5th Guards Tank Corps each had a breakthrough tank regiment with Churchills, and the Steppe Front's 5th Guards Tank Army contained the Churchill-equipped 36th Heavy Tank Regiment. US M4 Sherman tanks had just begun to arrive in the USSR, and some sources indicate 38 M4A2 tanks with diesel engines were in the 229th Separate Tank Regiment of the Central Front's 48th Army, but the M4s either were not engaged during *Zitadelle* or the regiment upgraded from its M3S Lees to Shermans later in the year.

A Tiger I heavy tank. Although Operation *Zitadelle* is famous for the employment of Tiger and Panther "animal" tanks, Tigers had actually been used in small numbers in late 1942 and early 1943. A Tiger captured in the Leningrad area was extensively tested, leading the USSR to begin to develop tanks with heavier armament, although these would not join the Soviet tank force until after Kursk. (Photo by Roger Viollet via Getty Images)

A 76mm-armed T-34 Model 1942. The large turret hatch could help the crew to rapidly "bail out" of the tank when hit. The hatch made it impossible, however, for the commander to ride with his head just out of the hatch for greater situational awareness as German tank commanders often did. (Photo by Sovfoto/Universal Images Group via Getty Images)

SU self-propelled guns would make up a major portion of the Soviet armored force in 1944–45 but only modest numbers were available during *Zitadelle*. Three self-propelled artillery regiments with the new SU-152 SPG were assigned to the defense along with four other regiments with mixes of SU-76s and SU-122s, giving Rokossovsky a total of 104 SPGs and Vatutin 54. Another 70 were in Konev's reserve Steppe Front. With the USSR only beginning to field its answer to the German assault guns in the summer of 1943, the Kursk defenders had almost as many SU-76i 76mm SPGs based on the captured PzKpfw III chassis as SU-76s.

Soviet self-propelled gun strength, July 1, 1943, Operation *Zitadelle*

Front	SU-76	SU-76i	SU-122	SU-152	Total
Central	0	33	47	24	104
Voronezh	18	0	24	12	54
Steppe	22	0	36	12	70
Total	40	33	107	48	228

TECHNICAL FACTORS

Soviet medium, light, and heavy tanks

T-34s on the offensive during the winter of 1942–43. The T-34's powerful diesel engine and wide tracks gave it excellent mobility in muddy, icy, and snowy conditions. (Photo by Popperfoto via Getty Images)

The 76mm-armed T-34 medium tank had only received minor improvements since the beginning of the conflict, and by July 1943 was increasingly overmatched by its German opponents. The T-34 was a revolutionary design when it first entered combat in 1941, with a superb balance of firepower, protection, and mobility. The tank featured thick, sloped armor and a powerful 500hp diesel engine and wide tracks giving excellent protection, and speed, agility, and mobility in the muddy and snowy conditions typical of the Eastern Front. The T-34's 76.2mm gun could defeat the armor of German *Barbarossa*-era tanks and fire an effective high-explosive round against enemy infantry, fortifications, and other soft targets.

Despite the technical superiority of the T-34s, training shortfalls, the lack of radios, and the two-man turret crew limited the impact of the tank on the battles of 1941 and 1942. The two-man turret forced the tank commander to also serve as gunner,

hindering his ability to direct the tank's movements and scan for threats and targets. Situational awareness was poor as the T-34 lacked the 360-degree vision cupola found on the German Panzers and the commander had to rely on a single traversable narrow-view periscope. The large, forward-opening turret hatch did not allow the commander to ride with his head out of the hatch as in German tanks. If the tank commander was also in charge of a platoon or company, the burden was even more severe. Most Soviet tanks lacked radios, forcing commanders to stand in the hatch and try and direct their platoons or companies with difficult-to-see flag signals, making them vulnerable to enemy fire and leaving one gun unmanned. As a result, Soviet tank units tended to simply follow the movements of the commander's tanks and fire at the same target, leading to them bunching up in battle, not taking advantage of terrain, and making them easy targets for enemy guns.

Newly produced T-34s. The USSR ruthlessly focused on producing as many tanks as possible, resulting in a portion reaching the front with technical defects. Truck production was minimal, and large numbers of US-provided Lend-Lease trucks only reached the Soviets in 1943 and 1944. (RIA Novosti archive, image #1274/V. Kaushanov/CC-BY-SA 3.0)

After superior German tactics overwhelmed the poorly trained and organized Red Army tank force during Operation *Barbarossa*, the USSR evacuated its war-supporting industries from the Western Soviet Union to the Urals in the autumn of 1941. Locked in a desperate struggle for survival, the Soviets maximized tank production by ruthlessly simplifying the 76mm-armed T-34 manufacturing process and retaining the same basic design rather than pursuing improved models. The T-34 Model 1942 had a simplified hull design and lacked the refined craftsmanship of the early 1941 models, but production time was reduced by half. The T-34's original 76.2mm main armament had 861 parts, but the version produced after the relocation to the Urals was reduced to 614. Ultimately, 35,120 76mm-armed T-34s were produced, more than the entire German wartime production of all tank types. With a further 19,430 T-34/85s fielded in 1944 and afterwards, the T-34 became the most produced tank of World War II.

The majority of the T-34s in the order of battle at Kursk were the Model 1943, introduced in late 1942 with a new, easier-to-produce cast turret with a distinctive hexagonal shape. The new turret was larger and allowed the tank to carry 100 main gun rounds rather than the Model 1942's 77. The Model 1942's cumbersome single large hatch was replaced by two forward-opening hatches. To increase the amount of fuel carried, two 40-liter external fuel boxes were mounted on the rear of the tank, or three cylindrical fuel containers mounted on the sides of the hull. The external fuel tanks were not directly connected to the fuel supply, and the fuel had to be pumped by the crew, either by hand

T-34s and Soviet infantry at a marshaling site in 1943. The T-34s are Model 1942 versions, able to carry 77 main gun rounds, unlike the Model 1943 with a larger hexagonal turret that could accommodate 100. Red Army tanks often carried patriotic slogans, in this case "for the homeland." (Photo by Keystone/Getty Images)

T-34s operating in the open Steppe terrain that characterized much of the fighting on the Eastern Front in Ukraine in 1943 and 1944. (From the fonds of the RGAKFD in Krasnogorsk via Stavka)

or with a small electrical pump, to gas up the vehicle. T-34s in 1943 were more likely to be equipped with radios, and later Model 1943s were produced with a redesigned cupola giving the commander 360-degree visibility. Numbers of surviving Model 1942s with the smaller turret design remained in the force at Kursk along with the Model 1943s.

By 1943, the 76mm-armed T-34's previous advantages in firepower and armor were being overtaken by the Wehrmacht as the increasing numbers of long 75mm and 88mm guns now on German tanks and assault guns could penetrate the T-34 at longer ranges. The T-34's F-34 76.2mm main armament was still an excellent weapon for engaging enemy soft targets with high-explosive rounds and was able to deal with German PzKpfw III and IV tanks at normal combat ranges. The gun was, however, unable to penetrate the frontal armor of the new Tigers and Panthers and could only attempt to engage them by hitting the flank or rear armor. The Tiger was only present in limited numbers and had mobility shortcomings, but its gun and heavy armor made it an excellent tank-killer at long range. Technically the German Panther outclassed the 76mm-armed T-34 in all categories, but major mechanical reliability issues kept the brand-new tanks rushed to the front for the Kursk offensive from having a major impact until later in the year.

Often overlooked are the T-70 light tanks, along with small numbers of the earlier T-60, that made up over a quarter of the Soviet tank force at Kursk. The T-60 was based on the large numbers of light tanks developed by the Soviets in the 1930s and was rushed into production in the early days of the German invasion to meet the Red Army's desperate need for tanks. Automotive factories that could not make larger tanks were able to shift to light tank production. The T-60 was poorly armored, had difficulty maneuvering in mud and snow, and with a two-man crew the commander

A Soviet T-60 light tank in action with Soviet infantry. The obsolete T-60 was still present in small numbers during the battles around Kursk, along with the improved but still severely outgunned T-70. (Courtesy of the Central Museum of the Armed Forces, Moscow via Stavka)

had to serve also as gunner for the 20mm ShVAK main armament. The T-60s could only engage German light tanks and the 20mm was too small to have an effective high-explosive round, further limiting its usefulness on the battlefield. Cynical crews dubbed the vehicle the BM-2 for "Bratskaya Mogila na Dovolkh," "a brother's grave for two." Efforts to up-armor the T-60 in 1942 only made the tank more sluggish.

In March 1942, work begun to improve the T-60's armament ultimately led to a fully redesigned tank, the T-70, that used many of its predecessor's components. While a much better design than the T-60, the T-70 still had inadequate armor and was underarmed with a 45mm main gun. The tank carried 45 rounds for the main armament and had a coaxial 7.62mm DT machine gun but retained the two-man crew. The commander in the turret was now even more overtasked, as the 45mm had to be loaded shell by shell unlike the T-60's belt-fed 20mm. Mobility remained poor and the T-70s were unable to keep up with the T-34s. A total of 8,226 were produced by the time production ceased in October 1943. The factories producing the T-70 would shift in 1943 to work on the SU-76, a self-propelled gun using the T-70 chassis but fielding a much heavier and more useful main armament.

A Soviet T-70 light tank near Voronezh in February 1943. Well into 1943, T-70s comprised almost a third of a standard Soviet tank brigade's order of battle and were often used in action as substitute main battle tanks, resulting in heavy losses. (Bettmann/Getty Images)

The KV-1 heavy tank was developed along with the T-34 to produce "shell-proof" tanks that could withstand the German 37mm antitank gun first encountered during the Spanish Civil War. The KV-1 had excellent armor for 1941, reasonable mobility, and the same 76.2mm main armament as the T-34. The KV's era of dominance had passed by early 1943, however, with German long 75mm tank and towed antitank guns better able to deal with the KV-1's armor. Soviet 1942 armored brigades contained both T-34s and KVs, but the heavy tanks were unable to keep up with the T-34s, and in 1943 KV-1s were formed into separate heavy tank regiments used for infantry support. As the KV-1 carried the same gun as the more mobile T-34, efforts were underway in 1943 to up-gun the design to carry an 85mm gun, but the resulting KV-85 would only be fielded after Kursk. In the interim, Soviet designers produced the KV-1S (*skorostniy*: speedy), with lighter armor, more reliability, and better speed. The redesigned turret gave the tank commander a dedicated hatch and repurposed the KV-1's rear machine gunner as the loader. Over 1,300 were produced before the arrival of the T-34/85 offered a less expensive and faster vehicle with a better primary armament.

Disabled KV-1 heavy tanks. The KV-1 had panicked German infantry during the early days of Operation *Barbarossa*, as their 37mm antitank weapons had almost no capability against the tank's thick armor. By 1942, 50mm and 75mm German towed and tank-mounted guns proved much more capable against the KV-1. (Nik Cornish at www.stavka.photos/)

KV-1 tanks being assembled in early 1943. In late 1941 and 1942, KV-1s had been integrated with T-34s and T-60s in Soviet tank brigades, but the slow speed and heavy weight of the KVs hindered operations. By 1943, KV-1s were employed in separate tank regiments allocated to the infantry support role. (Photo by Picture Post/Hulton Archive/Getty Images)

Lend-lease tanks

The massive losses during the early months of Operation *Barbarossa* led Moscow to request tanks from the Western Allies and by July 1942, 2,200 of the Soviet Army's 13,500 tanks were Lend-Lease models. By the summer of 1943, the Red Army's use of Lend-Lease tanks was at a turning point, with the 1941–42 Matildas, Stuarts, Lees, and 2-pounder Valentines still a significant portion of the force but now largely consigned to regiments and separate brigades used for infantry support. The Lend-Lease tanks that would dominate the last two years of the war – Valentines now carrying 6-pounder (57mm) guns and M4 Shermans – were just beginning to arrive in the USSR.

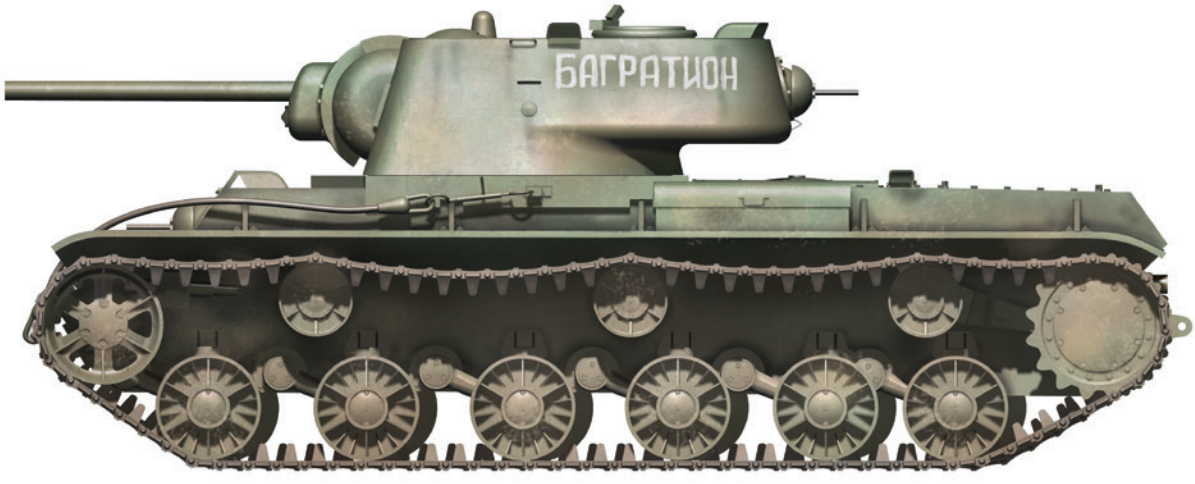
B

THE KV TANKS

1. KV-1, 262nd Heavy Tank Regiment, 7th Guards Army. The KV-1 shocked the invading German forces in the summer of 1941, but over the next two years, the Wehrmacht fielded improved antitank weapons better able to penetrate its armor. The inability of the heavier and less speedy and agile KVs to keep up with the T-34s led to them being formed into separate heavy breakthrough tank regiments for infantry support. The KV-1 portrayed participated in the Voronezh Front's defensive operations against the III Panzer Korps and was disabled during the subsequent Soviet Operation *Rumyantsev* offensive against Belgorod and Kharkov. The tank carries no tactical markings, but the crew has added "Bagration," a patriotic reference to a Russian general killed during the Battle of Borodino in 1812, to the side of the turret.

2. KV-1S, 13th Guards Heavy Tank Regiment, Bryansk Front. Frustration with the KV-1's weight and slow speed led to the design of the KV-1S, which was several tons lighter and featured an improved powertrain. Most importantly, the design included a new turret with a three-man crew, and the tank commander no longer had to serve as a gunner or loader. The tank retained the KV-1's rear-facing turret machine gun to sweep any attacking enemy infantry off the rear deck, but it was to be used by the commander when necessary and did not have a dedicated crewman. The KV-1S featured a 360-degree vision cupola, but oddly it did not have a hatch, leaving the loader's hatch the only functional one on the turret. The 13th Guards Tank Regiment, along with several other KV-1S units, lost heavily when sent into frontal assaults against German antitank guns in the early stages of Operation *Kutuzov* on July 13. By April 1943, due to its vulnerability and expense, KV-1S production was halted and the Soviets concentrated on developing the T-34/85 and new series of Stalin heavy tanks.

1



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A disabled Matilda tank. The Matilda was one of the least popular Lend-Lease tanks used by the Red Army due to its slow speed and mobility problems in poor conditions. The 201st Tank Brigade of the heavily engaged 7th Guards Army of the Voronezh Front operated 16 Matildas along with 31 Valentines during the defense of the Kursk salient. (Nik Cornish at www.stavka.photos/)

Red Army officers were critical of Western designs even though the early arriving Matildas, Valentines, and M3 Stuarts were clearly superior to the light T-60s and T-70s which made up over 50 percent of Soviet tank production in the first half of 1942. The first Lend-Lease deliveries consisted of Matildas and Valentines, both equipped with 2-pounder (40mm) guns, which lacked the ability to fire an effective high-explosive round. The Red Army considered the Matilda's armor to be the equivalent of the KV-1's, but the vehicle was slow, had poor mobility in snow, and the tank's two engines caused maintenance difficulties. The Soviets preferred the Valentine, as it was faster, better in snow, and had a more reliable track and suspension system. Canadian-produced Valentines became particularly favored, as their General Motors engines were more reliable than British power plants. In late 1942, the Valentine was modified to carry a more effective 6-pounder (57mm) gun. The Red Army continued to favor the Valentine long after the Western Allies considered it obsolete, and after 1943 Valentines were produced in Canada solely for Soviet use. The continued supply of Valentines, used in the field as light tanks, allowed the USSR to halt production of the T-70 and switch those factories to the SU-76 and SU-76M, which used the T-70 chassis and were ultimately produced in numbers second only to the T-34.

The first US tanks to arrive were M3 Stuarts, and as with most Lend-Lease tanks it was given mixed evaluations by Soviet officers. The 37mm main gun was considered superior to the T-70's 45mm, and the four-man crew and two-man turret were clearly superior to the Soviet light tanks with their one-man turret designs, but the flat rubber tracks were prone to slipping on icy roads or difficult terrain. Reflecting their focus on combat efficiency over crew considerations, the Soviets regarded the rubber pads inside the Stuart for crew safety as fire hazards and removed them before

C

LEND-LEASE TANKS

1. M3S (Lee), Voronezh Front. The Soviets only grudgingly accepted Lend-Lease deliveries of M3 medium tanks as they considered the tank to be too vulnerable given its height and modest armor. The M3s sent to the USSR were configured as Lees with the original US-designed top turret with a commander's machine gun and seventh crewman to man the radio in the body of the tank rather than the British modified Grant design with six crewmen. Designated M3S to differentiate them from the M3L Stuart light tank, only 109 Lees were in the Soviet order of battle at the beginning of *Zitadelle* and were typically used to equip some of the separate tank brigades assigned to support the infantry armies manning the forward lines of defense. Lend-Lease tanks were often left in their original olive drab paint scheme, and this tank also features a slogan added by the crew.

2. Valentine Mark III, 13th Guards Tank Brigade, 4th Guards Tank Corps. The 13th Guards Tank Brigade, a subordinate element of the 4th Guards Tank Corps, was equipped with Valentine tanks during the Kursk campaign. The corps was directly controlled by the Steppe Front, and although not committed during the repulse of *Zitadelle*, was heavily engaged during Operation *Rumyantsev*, which resulted in the capture of Belgorod and Kharkov. The Red Army regarded the Valentine as the best British Lend-Lease tank it received and requested increasing numbers of

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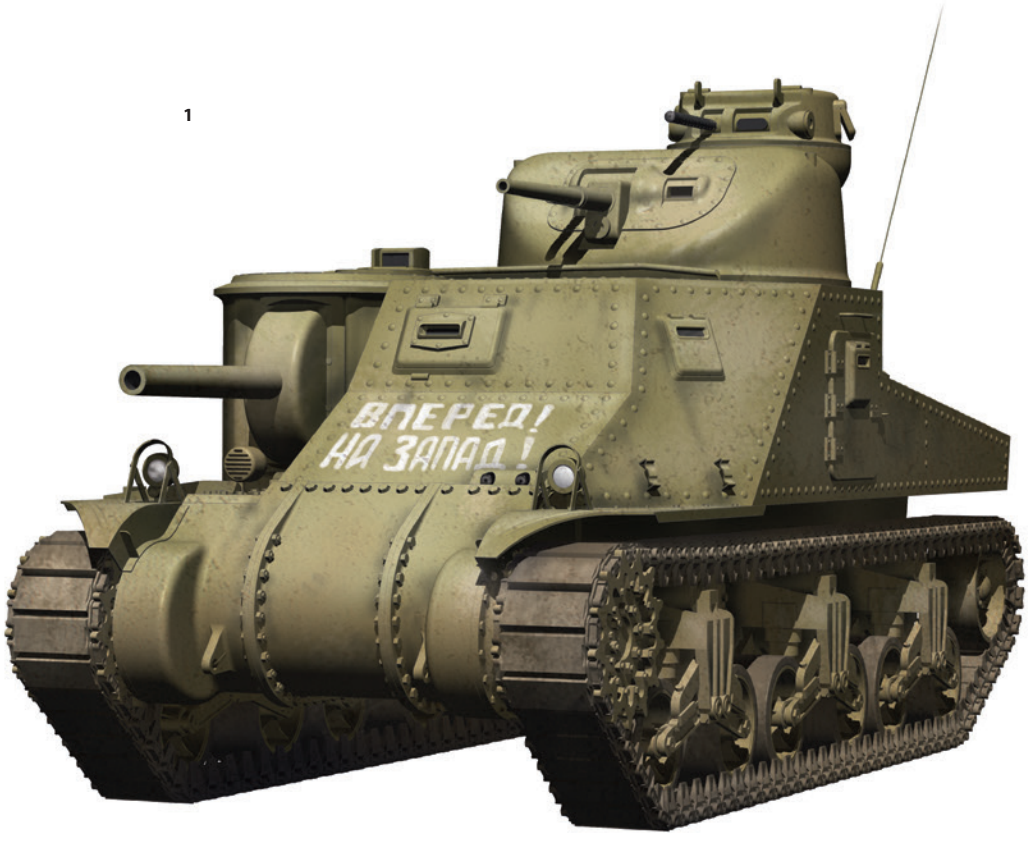

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A US M3 light tank in Soviet service. The Red Army never favored the Stuart, even though it was superior to their own T-60 and T-70 light tanks, and eventually settled on the Valentine to fulfill the light tank role in their tank and mechanized corps. (Nik Cornish at www.stavka.photos/)

sending the tanks into action. The tank was given the designation M3L (*legkhiy* – light) to differentiate it from the M3 Lee medium tank (M3S for *sredniy* – medium). A total of 1,676 Stuarts were sent to the USSR with 443 sunk during transit. The last 340 to arrive were M3A1 models with turret baskets, although the Soviets felt the turret was now excessively cramped, an assessment shared by many British and US crews. By the summer of 1943, there were fewer Stuarts in front-line service and although the Stuart M5 variant was offered to the USSR, Red Army officers preferred Valentines for the light tank role.

The M3S Lee was another controversial tank sent to the Red Army in 1941–42. The Soviets considered the M3S to be vulnerable due to its weak armor and excessive height, and cynical Red Army tankers dubbed it the "coffin for seven brothers." A total of 1,386 M3s were sent to the USSR, with 410 lost before arrival. Although occasionally described as Grants, the M3s used in Soviet service all had the Lee configuration with a seven-man crew and additional small machine-gun turret atop the 37mm turret. By the summer of 1943, the M3Ss were employed in the regiments and brigades assigned to infantry armies. Churchill tanks, known as MK.4s in Soviet service, were also used by Red Army tankers at Kursk, but only a total of 258 reached the USSR. The Soviets disliked the Churchill's slow speed but considered the tank well protected and valued the 6-pounder main armament.

US Lend-Lease M3S Lee tanks. M3s were unpopular with the Red Army due to their height and weak armor, and were typically assigned to separate tank brigades or regiments used for infantry support, often serving alongside M3L Stuart light tanks. (From the fonds of the RGAKFD in Krasnogorsk via Stavka)

Self-propelled guns

In late 1942, the Red Army began to assemble lessons learned from a year of intense combat with Germany's Panzer forces and noted the utility of the Wehrmacht's *Sturmgeschütz* self-propelled assault guns. As a result, in 1943 the Soviets began to mount the 76.2mm ZiS-3 divisional gun on the T-70 tank chassis and 122mm ML-20 M1938 howitzers on the KV heavy tank chassis, although limited numbers of these vehicles were in the force at the time of Kursk. The vehicles were designated *samokhodnaya ustanovka* or "self-propelled artillery," and the SPGs were designed the SU-76 and SU-122, respectively. The Soviets also sought to employ heavier guns on SPGs to be able to deal with the new heavily armored German tanks. Tests on a German Tiger I captured near Leningrad in early 1943 indicated that the 76.2mm used by divisional guns and the T-34 were ineffective against the Tiger's frontal armor at normal combat ranges, and the 122mm howitzer on the SU-122 also had a disappointing performance. As the massive shells of the ML-20 152mm howitzer had some capability, the gun was mounted on a KV-1S chassis to produce the SU-152. The 85mm antiaircraft gun could effectively engage the Tiger, leading to programs to up-gun the T-34 and field an SU with an 85mm gun, but these would only join the force after the Kursk campaign.

The initial SU-76 design mounted the standard Red Army ZiS-3 76mm divisional gun on a T-70 chassis. The SU-76 did not use the T-70's in-line engine configuration but had a separate engine and transmission powering each track – with the driver sitting directly between them – leading to numerous reliability problems. The SU-76 passed its firepower but not its mobility tests in December 1943, but the program's lead designer, Semyon A. Ginzburg, argued that the problems would be worked out in production, and three SU-76 Self-Propelled Artillery Regiments were available to serve at Kursk. Mobility issues with the poor engine arrangement and overheating in the armored compartment, which led the crews to dub the vehicle the *Dusheguboy* (gas chamber), led to a redesign in late 1943 that produced the much-improved SU-76M. Ginzburg, who had worked on the prewar T-26 and T-50 tanks and was one of the few tank designers to survive Stalin's purges, was held accountable for the SU-76's initial problems, demoted, and assigned to the front. Posted as assistant commander for technical issues

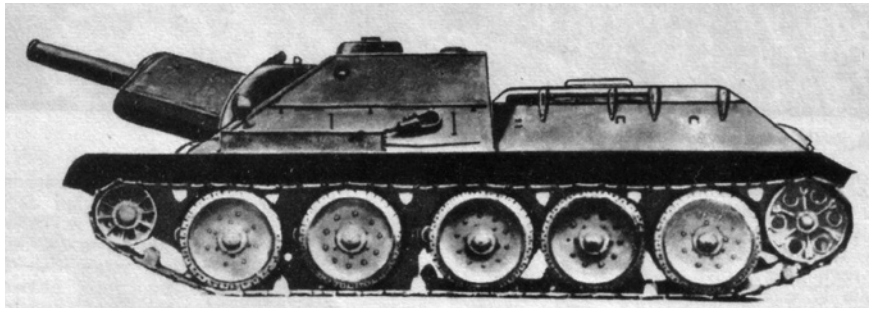
The Soviets modified over 200 captured PzKpfw IIIs to carry a 76.2mm gun in a newly enclosed assault gun-style superstructure. The SU-76s made up a large percentage of the SPG force at Kursk, as only small numbers of the new SU-76, SU-122, and SU-152 had reached the front. (Courtesy of the Central Museum of the Armed Forces, Moscow via Stavka)

German troops examining a disabled SU-152 in September 1943. The urban fighting in Stalingrad convinced the Soviets that they needed the capability to destroy enemy positions with a protected heavy howitzer, resulting in the crash program to develop the SU-152. The SPG could only carry 20 of its large rounds, but the huge shells were not only extremely effective against German fortified positions but could knock out enemy heavy tanks if fired from close range. (Keystone-France/Gamma-Keystone via Getty Images)

to the 32nd Tank Brigade of the 29th Tank Corps, Ginzburg was killed in action during the Kursk campaign on August 3, 1943.

One of the more unusual Red Army armored fighting vehicles at Kursk was the SU-76i. The i stood for foreign (*inostrannaya*). The Soviets had already modified small numbers of captured German vehicles to carry 122mm howitzers in 1942, and when numerous PzKpfw IIIs and StuG IIIs were captured at Stalingrad, they were modified to carry the S-1 76mm gun, the antitank variant of the standard ZiS-3 divisional gun. Ultimately, 201 SU-76is were fielded, 20 of these configured as command (*komandirskiy*) vehicles with an extension on the right side of the vehicle for a commander's cupola. Some SU-76i regiments used PzKpfw IIIs as command vehicles. The SU-76i first saw combat during the Kursk campaign, with 33 serving with the Central Front. The conversion program was ended in November 1943 with the introduction of the improved SU-76M.

In 1942, Soviet designers modified the T-34 chassis to support a completely enclosed assault gun mounting a 122mm howitzer. The resulting SU-122 proved an effective close-support weapon against enemy soft targets, although the HEAT antitank round was never as effective as hoped. The SU-152 proved more successful against enemy armor with its 152mm ML-20S howitzer on a KV-1S chassis. The first regiments were formed in



Impressed with the effectiveness of German StuG assault guns that mounted more powerful guns on turretless tank chassis, the USSR began to field numbers of its own designs in 1943. The SU-122 was armed with a 122mm M-30S howitzer in an enclosed fighting compartment on a T-34 chassis. The howitzer had a limited traverse, and only 638 were produced before production halted in late 1943 in favor of other SPG designs. (Wikimedia Commons/Public domain)

May 1943, and the SU-152 was rushed to the front where it gained the reputation of being able to handle the heavily armored German Tiger tank. A total of 670 SU-152s were produced, the last in January 1944, before the design was altered to use the IS-2 heavy tank chassis, producing the ISU-152. 1,885 ISU-152s were produced by the end of the war.

Tactically, the SUs were usually used for overwatch fire support of attacking or defending infantry or tank forces, and as they lacked coaxial or hull machine guns, they had to rely on the infantry and armor units they supported for close protection. The Soviets initially fielded mixed regiments with SU-76s and SU-122s, but the major differences in firepower and mobility soon led to the fielding of distinct light SU-76 and medium SU-122 regiments. Throughout the war, due to their tactical employment, SUs suffered only half the level of losses of the medium tank forces.

THE CAMPAIGN

Operation *Zitadelle*

With the destruction of the encircled 6th Army in the Stalingrad *kessel* in February 1943, the entire German position in the southern USSR was in peril. Exploiting Soviet forces soon captured Rostov and drove into eastern Ukraine. Within weeks, however, Field Marshal Erich von Manstein's reinforced Army Group South launched a sudden counteroffensive. The overextended Red Army armored spearheads were cut off and German forces retook Kharkov, leaving a Soviet-held salient around the city of Kursk and a German-held salient just to the north around Orel. Galvanized by the disasters at Stalingrad and in North Africa, Hitler directed the mobilization of industry and manpower and the rebuilding of the Wehrmacht's Panzer force. To secure the initiative in 1943, the *Ostheer* would use its refurbished Panzer divisions against the Kursk salient left by the winter fighting. Army Group Center would strike due south from the German-held Orel salient towards Kursk with General Walter Model's 9th Army and meet Army Group South's 4th Panzer Army striking north from the Kharkov area. The offensive, codenamed *Zitadelle*, was originally planned for early May, but the attack was postponed until July 5 to allow the new Panther medium tank to arrive at the front.

The SU-122 was initially deployed in mixed regiments with the SU-76, but it proved difficult for the small maintenance element to support two different vehicle types. The SU-122's armor and enclosed fighting compartment also allowed it to move closer to enemy positions in combat than the weakly armored SU-76s, and the Soviets soon began to organize separate SU-76 Light and SU-122 Medium Self-Propelled Artillery Regiments. (From the fonds of the RGAKFD in Krasnogorsk via Stavka)

Over 70 percent of the German armor available on the Eastern Front was concentrated for the *Zitadelle* offensive. Army Group South contained the strongest armored force with 1,508 Panzers and assault guns. Von Manstein planned to launch a direct assault against Soviet defensive lines with three tank-heavy corps. General Hermann Hoth's 4th Panzer Army would drive directly towards Kursk with its XLVIII and II-SS Panzer Korps, while the III Panzer Korps under Army Detachment Kempf attacked on Hoth's right to serve as a flank guard. Von Manstein's attack force included nine Panzer and Panzergrenadier and 11 infantry divisions. Kluge's Army Group Center would attack south from the Orel salient with Model's 9th Army containing six Panzer, two Panzergrenadier, and eight infantry divisions with 747 tanks and assault guns. Model was wary of losing his armor while attempting to penetrate the heavy Soviet defensive lines around Kursk, and planned to initially attack with infantry divisions, supported by assault guns and Ferdinand tank destroyers, and then commit his Panzer forces once they broke through Soviet defenses.

Despite the hopes placed on the Tigers and Panthers, only 347 of 1,866 tanks at Kursk were new generation vehicles, and most armored units at Kursk were still equipped with PzKpfw IIIs and IVs. The 432 obsolescent Panzer IIIs had a long 50mm gun and could penetrate T-34 armor with special ammunition if engaging at under 500m. Most of the 841 Panzer IVs were upgraded G models with long 75mm guns. The PzKpfw III's turret ring was too small to have the 75mm gun upgrade, and so its chassis was used to produce the StuG III assault gun, which could use the installed long 75mm either for infantry support or antitank purposes. Hitler placed great store on the impact of the new generation tanks and delayed the offensive to allow more to reach the front. The Tiger I's 88mm was lethal at long range and its frontal armor was impervious to the T-34 at normal combat ranges but its weight limited mobility, and due to its expense, the Tiger was only fielded in small numbers. The Panther was new to the battlefield in July 1943 and was rushed to the front with inadequate testing, and the two battalions committed to the attack suffered large numbers of mechanical breakdowns during the fighting. Both Army Group South and Center had Tiger Is in their attacking forces, and the two Panther battalions were attached to the 4th Panzer Army in the South. Model's 9th Army received two battalions of Ferdinand tank destroyers, a heavily armed vehicle with the L71 88mm main gun with a longer reach even than the Tiger I. Overall, the Soviet tank force had the advantage of numbers, but the three-man turrets and radios in German tanks, along with the crews' superior gunnery training, usually allowed the Panzers to inflict heavy losses on the hastily trained Red Army tankmen at the tactical level.

A destroyed 76mm armed T-34 in the Belgorod–Kharkov region in March 1943. Von Manstein's "backhand blow" counterattack in early 1943 caught Soviet armored spearheads overextended and vulnerable, and recaptured Kharkov before the spring thaw brought mobile operations to a halt. (Photo by Mondadori via Getty Images)

The Soviet high command was fully aware of the *Zitadelle* plan, and Stalin's senior marshals persuaded him to allow the Red Army to defeat the German attack before shifting to their

Soviet troops advancing behind Valentines during Kursk. Less than 100 Valentines served during the *Zitadelle* fighting, but the type became more common later in the war as the Soviets requested additional numbers to replace its obsolescent T-60 and T-70 light tank force. (Photo by Laski Diffusion/Getty Images)

own summer offensive. The salient was defended by multiple deep defensive zones consisting of trenches, antitank gun positions, obstacles, and minefields backed by armored reserves. Soviet forces laid 503,663 antitank and 439,348 anti-personnel mines, and their infantry and antitank guns manned thousands of kilometers of trenches. Likely corridors for German Panzer attack were prepared with 1,600 mines per kilometer. The Voronezh and Central Fronts were equipped with additional antitank gun brigades and attached artillery corps to deluge the enemy with intense firepower during the battle. The defending infantry armies had tank regiments and brigades attached to aid in the defense, some dug into hull-down defensive positions alongside the antitank guns, and others held in reserve to launch local counterattacks. Vatutin and Rokossovsky also had extensive armored reserves and as the Germans advanced through the defenses, could call upon their separate tank corps and the attached 1st and 2nd Tank Armies to counterattack. The Steppe Front served as the ultimate reserve for the defense.

The Northern Attack. Never optimistic about the offensive, General Walter Model planned for his infantry to grind down the Soviet defenders before inserting his Panzer divisions to drive on Kursk. Opposing Model's *Schwerpunkt* (main thrust) was Rokossovsky's 13th Army holding a 22km front. The 13th controlled the 129th Tank Brigade with 49 tanks, including ten KVs and 21 T-34s, along with the 27th and 30th Guards Tank Regiments with a total of 44 KV-1s. Rodin's 2nd Tank Army, with the 3rd and 16th Tank Corps and 11th Guards Tank Brigade, served as the front-level reserve. Rodin was equipped with 305 T-34s and 142 T-60/70 light tanks. Rokossovsky also had the 9th and 19th Tank Corps, with a total of 232 T-34 and 104 other tanks, under direct control.

The offensive began on July 5 and the 9th Army's attacking infantry divisions, including the specially strengthened 78th Sturm Division, made little initial progress. The 653rd and 654th Antitank Detachments with their 90 Ferdinands were ordered to move forward and reinvigorate the attack – an assault role for which the vehicle was poorly suited – and took heavy losses to mines. To the west of the Ferdinands, an attack by the 6th Infantry Division supported by Tiger Is of the 505th Heavy Tank Battalion made better progress, and the 13th Army's commander committed his 129th Tank Brigade and the SU-122s of the 1442nd Self-Propelled Artillery Regiment to augment the defenders. By the end of the first day, Model's main attack had only advanced about 4–8km and had not broken through the 13th Army's first line of defense.

A Panzer IV with the side armor typical of German medium tanks at Kursk. Despite the popular focus on the new, heavier tank designs, the majority of the attacking armored force was composed of earlier Panzer IIIs and IVs. (Nik Cornish at www.stavka.photos/)

Although Model had not yet committed the bulk of his Panzer force, Marshal Georgy Zhukov, the Soviet high command coordinator for the defense of the salient, pressured Rokossovsky into an early armored counterattack on July 6. Rokossovsky ordered the 2nd Tank Army and the separate 19th Tank Corps to make the attack, but the Soviet tank brigades struggled to move forward through Red Army lines and get into position. Of all the forces committed, only the 16th Tank Corps was initially able to get into action, and its 107th Tank Brigade advanced without reconnaissance and lost 46 of its 50 tanks to long-range fire from the Tigers of the 505th Heavy Panzer Battalion. The Corps' 164th Tank Brigade attempted to move around the German flanks and lost an additional 23 tanks to a battlegroup from the 2nd Panzer Division while destroying ten. After the losses, General Rodin convinced Rokossovsky to allow his 2nd Tank Army to take up defensive positions. The second day also saw the Ferdinands spar with Soviet armor, and at least one of the large German vehicles was knocked out by a side hit from a 1442nd Self-Propelled Artillery Regiment SPG. Despite

D

EARLY LIGHT SELF-PROPELLED GUNS

1. SU-76, 1440th Self-Propelled Artillery Regiment, 6th Guards Army, Voronezh Front. The Soviets formed their early production SU-76s (designated SU-12s until May 1943) into mixed regiments with SU-122 medium self-propelled guns. Reliability problems with the early SU-76 design and difficulties integrating the two very different SU designs together led to the formation of separate light SU-76 regiments, each with five batteries of four SU-76s and one in the regimental headquarters. Three of these regiments fought at Kursk, the 45th, 193rd, and 1440th. The 6th Guards Army suffered the full weight of the 4th Panzer Army attack, leading to heavy fighting and losses by the 1440th Regiment.

2. SU-76i, 5th Guards Army, Steppe Front. The Soviets modified several hundred of the PzKpfw IIIs captured from the German 6th Army at Stalingrad to carry 76.2mm S-1 guns. The S-1s were shortened versions of the standard 76.2mm 1942 ZiS-3 divisional gun. The SU-76i (i for foreign) mounted the gun in a fully enclosed crew compartment, although the Panzer III's hull machine gun was removed, and the crew had to rely on pistol ports for close defense. SU-76is fought with the Red Army until early 1944, but production was halted as the improved and cheaper-to-produce SU-76M took the field. Regiments with SU-76is fought with the Voronezh, Central, and Steppe Fronts during *Zitadelle*.

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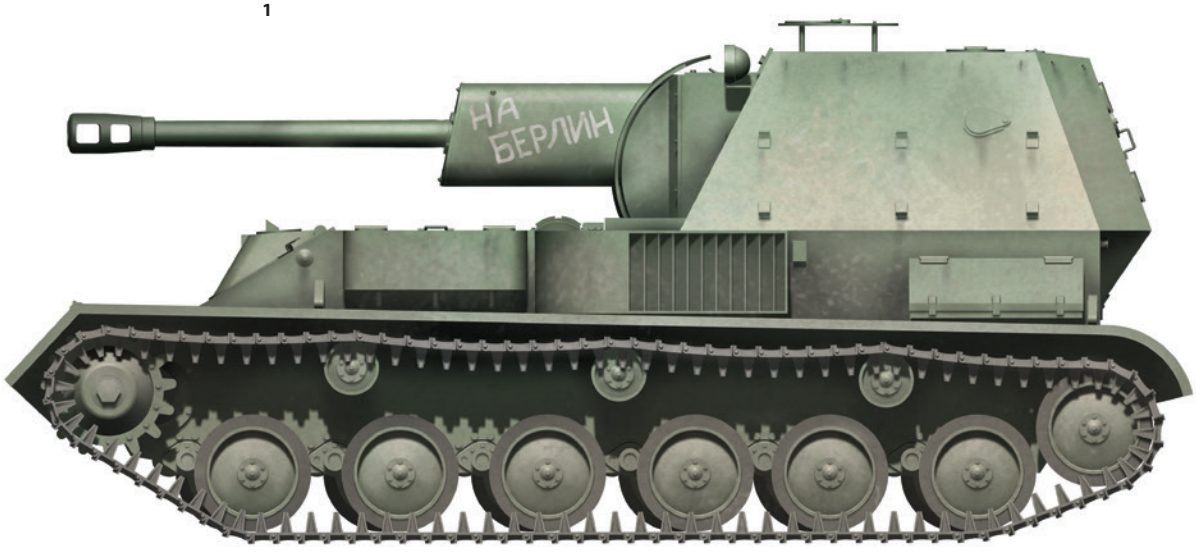

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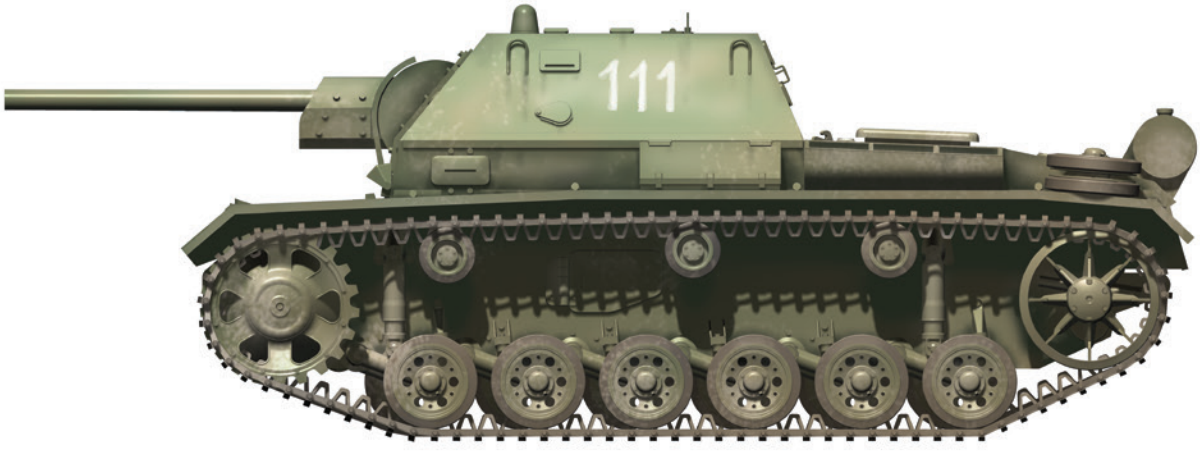


SdKfz 10-mounted troops of the SS Das Reich Panzergrenadier Division pass a disabled Churchill tank during the battle for Kursk. The Soviets considered the Churchills to be well armored but with poor mobility, and only about 300 served with the Red Army during the war. (ullstein bild via Getty Images)

the Soviet armor losses, the 9th Army only advanced 2–4km on July 6, and Model's forces had reached but not yet penetrated the 13th Army's second fortified defense line.

The 2nd Tank Army's subordinate corps were now committed piecemeal to supporting the defending Soviet rifle divisions, and Rokossovsky no longer retained a cohesive counterattack force. Model determined to concentrate his Panzers, firepower, and troops against the fortified villages of Ponyri and Ol'khovatka to break through the Soviet second defensive line, resulting in days of intense fighting for the two villages. SU-152s of the 1541st Heavy Self-Propelled Artillery Regiment were heavily engaged during the fighting around Ol'khovatka, and Soviet propaganda claimed that Major Aleksi F. Sankovsky's SU-152 knocked out as many as ten Tigers and Ferdinands. No Ferdinands were present in this sector, and it appears that Sankovsky may have only knocked out a single Tiger and damaged some others. The Soviet propaganda machine, however, played up the action and publicized the nickname "animal killer" (*Zvierboy*) for the SU-152, happy to have another hero to celebrate while giving the impression that the Red Army had a weapon that could handle the new generation of German tanks.

On July 8, Model ordered the 4th Panzer Division to attack Teploye near Ol'khovatka with 50 tanks and three Tigers to finally break the Soviet second fortified line. The Soviet 140th Rifle Division held off the assault with the support of the 3rd Antitank Brigade and the dug-in tanks of the 19th Tank Corps' 79th Tank Brigade. Like most battles at Kursk, the clash was at the battalion and regimental level rather than the swarms of maneuvering tanks of popular imagination. The Germans engaged in several hours of long-range dueling but found the dug-in Soviet tanks with only their turrets exposed

E

LIGHT TANKS

1. M3L (Stuart). The Soviets accepted US M3 Stuart light tanks in the desperate early period of the war, but were unhappy with its armament, light armor, and limited mobility in mud and snow. 1,336 were shipped to the USSR, with about 900 arriving and the others lost to German attacks on the convoys. By the Kursk campaign, few M3s, known in Soviet service as M3Ls (L=*legkhiy*, light) remained in front-line service. The Voronezh and Central Fronts contained a total of 77, likely M3A1 models with turret baskets as in the tank displayed. The Stuart's limited range was a key limitation for reconnaissance operations. The Red Army viewed the Valentine as more useful for the light tank and reconnaissance role and refused deliveries of the upgraded M5 Stuart variant in favor of larger numbers of Valentines.

2. T-70 Light Tank, 3rd Tank Corps, 2nd Tank Army, Central Front. The desperate need for tanks and the inability to produce enough T-34s to fill out its order of battle forced the Red Army to use light tanks as the second tank battalion in its tank brigades through 1943. By *Zitadelle*, only a few of the earlier T-60 light tanks remained in the force, but although the T-70 was much improved, its mediocre mobility, light armor, and 45mm main armament still made it of very limited utility on the battlefield. As the tank retained the T-60's two-man crew, it remained unlikely that the overworked tank commander in the turret would be able to capably employ his own tank, much less guide additional tanks if he was also a platoon or company commander. The pictured tank, along with 76mm-armed T-34s, engaged Model's 9th Army in the sustained fighting for the town of Ponyri on the Kursk salient's northern front.

1

2

The Kursk offensive saw the last extensive field use of PzKpfw III tanks, although the chassis would be used to field large numbers of the excellent StuG III assault gun. The PzKpfw III as well as Panzer IVs had additional skirt armor on their sides and turrets to increase protection against antitank rifles. (Nik Cornish at www.stavka.photos/)

difficult to hit, and the battle resulted in three PzKpfw IVs, four T-34s, and one KV destroyed. Model's forces failed to take Teploye and seized half of Ponryi. On July 9 and the 10th, renewed attacks finally captured Tepolye, but only with the commitment of two Panzer divisions to take a single small village. On July 11, concerned with the looming threat posed by the Soviet Western and Bryansk Fronts to the Orel salient to his rear, Model ordered his forces to go on the defensive.

Model's offensive had been costly, especially to the German infantry, and had never fully penetrated the Central Front's second line of defense. The losses to his armored force included 71 armored fighting vehicles totally destroyed and 308 damaged, but Model retained an intact force of Panzers to defend against the subsequent Soviet *Kutuzov* offensive against the Orel salient. German forces were able to recover and repair roughly three-quarters of their damaged vehicles, many of them disabled by mines. Rokossovsky likely lost about 220 tanks destroyed and another 100–200 damaged. The Central Front's 2nd Tank Army alone lost 138 destroyed and 80 damaged and the 13th Army, the most heavily engaged Red Army formation, had 80 of its 270 tanks completely destroyed. Despite being on the offensive, the Germans were able to achieve a favorable tank kill ratio on the northern side of the salient. Pressured by Zhukov, Rokossovsky committed his front's armored reserves on the second day of the German offensive, undercutting pre-battle plans to let the German armor be worn down by battling through the defensive lines, and committing his tank brigades to stand-up fights among the fortifications and minefields. Nevertheless, a deliberate summer offensive by multiple Panzer divisions had been stopped cold by a Soviet defense and the attack called off after four days of minimal gains.

A knocked-out T-34. Vatutin reinforced his defense lines on the second day of the German offensive with his entire tank reserve, slowing the German advance but suffering heavy losses over the next several days of intense combat. (Nik Cornish at www.stavka.photos/)

The Southern Attack. Unlike Model, von Manstein used his three Panzer korps to launch direct armor-led frontal assaults against the Soviet defenses. From west to east, these were the XLVIII Panzer Korps and II-SS Panzer Korps commanded by General Hermann Hoth's 4th Panzer Army and the III Panzer Korps under Army Detachment Kempf on the eastern bank of the Donets River. The XLVIII controlled the elite Grossdeutschland Panzergrenadier Division and the 3rd and 11th Panzer divisions, and the II-SS three Panzergrenadier divisions – Das Reich, Leibstandarte Adolf Hitler (LAH), and Totenkopf – that were equipped as full Panzer divisions despite their titles. The XLVIII Panzer Korps contained a Tiger battalion and the two newly arrived Panther battalions, and the II-SS's divisions each had a Tiger company. The III Panzer Korps controlled three additional Panzer divisions.

Soviet tank strength, Voronezh Front, July 5, 1943

Army/Tank Corps	T-34	T-70/60	KV	M3M Lee	M3L Stuart	Matilda or Valentine	Churchill	SU	Total
6 GA	46	5/0		24	54			21	150
7 GA	114	24/0	23			16/31		31	239
40 A	83	24/12							119
1 TA	477	89/13						21	600
2 GTC	99	72/0					16		187
5 GTC	127	63/0					21		211
Front Total	946	277/25	23	24	54	16/31	37	73	1,506

Hoth's assault on July 5 initially struggled to overcome Soviet defenses and unexpected terrain obstacles. The 6th Guards Army, directly in the path of the 4th Panzer Army offensive, controlled the 230th and 245th Separate Tank Regiments with M3M Lees and M3L Stuarts, along with its T-34- and T-70-equipped 96th Tank Brigade. The XLVIII's divisions were held up by antitank ditches and a flooded ravine and took losses from Soviet artillery while the engineers erected bridges. The newly arrived 39th Panzer Regiment's two battalions of untested Panthers bogged down in the muddy approaches to the ravine and over 100 were soon out of action due to mines, enemy fire, or mechanical failure. To the east of the stalled Panthers, the 11th Panzer Division skirted the ravine, and when the 6th Guards Army counterattacked with the 245th Tank Regiment, the Germans quickly knocked out 20 of the regiment's Lees and Stuarts. Hoth's II-SS Panzer Korps attacked to the east of the XLVIII and with all Luftwaffe support given to this sector, drove 9km into the Soviet defenses, the deepest penetration that day. Each of the corps' three SS Panzergrenadier divisions contained a company of Tigers, and these inflicted heavy losses on the counterattacking M3S Lee tanks of the 230th Tank Regiment. Many of Hoth's commanders chose to lead the first attacks with their Tigers rather than the more vulnerable PzKpfw IIIs and IVs, but this tactic made them more vulnerable to mines and allowed dug-in Soviet tanks and antitank guns more opportunities to hit them with close-range fire. Kempf's III Panzer Korps had the least success of all the attacking Army Group South formations. Attempting to break out of bridgeheads over the Donets, the Panzers were met by dug-in tanks of the 213th Tank Regiment to the north, Katyusha multiple rocket launchers that damaged a critical bridge, and mines that disabled 13 of the 19th Panzer Division's 14 Tigers.

Doctrinally, Vatutin's reserve 2nd and 5th Guards Tank Corps and 1st Tank Army were to be used for a concentrated counterattack only when

German infantry passing burning T-34s during the Kursk offensive. Soviet tanks were often able to successfully engage enemy forces from hull-down positions during the fighting, but hundreds were lost in the hasty counterattacks ordered by the senior leadership. (Hulton Archive/ Getty Images)

the attackers were sufficiently weakened, but his concern with the extent of the initial German penetration led him to order them into action on the second day. Katukov's 1st Tank Army with its 6th and 31st Tank and 3rd Mechanized Corps moved to engage the XLVIII Panzer Korps, and the 2nd and 5th Guards Tank Corps were sent to attack the SS Panzers. Despite his orders, Katukov reported that the German assaults were led by Tigers and Panthers, and his recommendation to immediately take up defensive positions was approved by Stalin himself. Much as to the north, Vatutin's main armored reserves were rapidly dedicated to supporting the rifle corps' second line of defense rather than being held in reserve for a later massed counterattack. For the remainder of the battle, the 1st Tank Army would battle to delay the XLVIII Panzer Korps assault, while the 2nd and 5th Guards Tank Corps launched repeated attacks against the II-SS Panzer Korps.

The II-SS Panzer Korps penetrated the Soviet second fortified line on July 6, although its flanks were vulnerable due to the failure of the XLVIII and III Panzer Korps to keep pace. Katukov's 6th Guards Tank Corps' 22nd Tank Brigade engaged approaching Panzers of the XLVIII's 3rd Panzer Division from defensive positions behind the Pena River, destroying three and damaging others while Soviet engineers blew a bridge in the area. The same day, T-34s of Katukov's 3rd Mechanized Corps' 14th Tank Regiment disabled 19 of the 39th Panzer Regiment's new Panthers by hitting their weaker side armor. While Katukov's two corps held the XLVIII Panzer Korps on the Pena, Vatutin attempted a large-scale counterattack to hit the advancing II-SS Panzer Korps' right flank. The attack was hastily mounted and although the 1st Tank Army's 31st Tank Corps and the independent 2nd and 5th Guards totaled 400 tanks, they were unable to coordinate their operations. The 5th Guards Tank Corps attacked head-on, but the flat terrain favored the SS tankers' advantages in long-range gunnery, costing the corps 110 tanks.

The KV-1S was an attempt to give the KV more utility by lightening the armor, redesigning the turret, and producing a tank with increased speed. Over 1,300 were fielded, but as the KV-1S was more expensive than the T-34 and carried the same 76.2mm gun, production was halted in late 1943 in favor of the up-gunned T-34/85. (Wikimedia Commons/Public domain)

An SU-76 self-propelled gun supporting infantry during the Kursk campaign. The Soviets usually employed the SU-76 in an overwatch fire support role for infantry or armored attacks, as it had weak armor and lacked a bow or coaxial machine gun for close defense against enemy fire or infantry attack. (Photo by Sovfoto/ Universal Images Group via Getty Images)

Although the road north was now weakly held, the III Panzer Korps' inability to keep pace on its right forced the Panzers of the II-SS to slow their advance and dedicate forces to secure their flank. Hoth had roughly 300 tanks and assault guns out of action due to mines, Soviet fire, or breakdowns, and the XLVIII's Grossdeutschland Division only had 80 operational tanks out of an initial strength of 350. Concerned with the breakthrough of the second line of defense, however, and with his frontal tank reserves already committed, Vatutin requested additional reinforcements on the evening of July 6. Stalin agreed, and the 2nd (168 tanks and SPGs) and 10th (185 tanks and SPGs) Tank Corps were dispatched to assist the Voronezh Front. General Rotmistrov's 5th Guards Tank Army was given alert orders to prepare to move into the salient.

The 2nd and 10th Tank Corps arrived to reinforce Vatutin on July 8. With the already committed 2nd and 5th Guards Tank Corps, the Soviets had a force of almost 500 tanks available for counterattacks. Vatutin ordered another assault against the II-SS Panzer Korps' eastern flank, but again coordination problems led to disjointed, piecemeal attacks, on this day

F

THE 5TH GUARDS TANK ARMY ATTACKS AT PROKHOROVKA, JULY 12, 1943

At 9 a.m. on July 12, General Rotmistrov ordered his reinforced 5th Guards Tank Army to begin its counterattack against the German force that had driven the farthest into the Kursk salient, the II-SS Panzer Korps. The advance of enemy forces the day before had overrun the 5th's planned staging areas, leading to a hastily and ill-prepared attack on the 12th. There was no time for reconnaissance or to plan artillery or air support. Rotmistrov's attack included attached corps and stretched for 25km along the front. In the center, the 5th Guard Tank Army's organic 18th and 29th Tank Corps directly attacked the Leibstandarte Adolf Hitler (LAH) Panzer Grenadier Division. The 29th overran the LAH's advanced elements on Hill 252.2, destroying four PzKpfw IV tanks, and then charged across open fields towards enemy positions. The LAH was occupying portions of the Soviets' original third line of defense and was able to take the attacking Soviet tanks under fire at long range. The scene shows the situation as the tanks of the 29th's 31st and 32nd Tank Brigades discovered an antitank ditch – part of the original Soviet defenses but unknown to the attackers – leading some to overturn into the ditch and others to turn to find a way around, exposing their flanks. The 29th was unable to close with the enemy and lost 102 of 212 tanks and SPGs in the attack, including 60 T-34s and 36 T-70s.

costing roughly 100 Red Army tanks. An attack by Luftwaffe Hs-129 tank-busters, one of the first uses of massed antitank aircraft, disrupted the attack by the 2nd Guards Tank Corps. The Luftwaffe claimed this was the first time an armored assault had been halted solely by air attack. Despite the losses, some Soviet tanks were able to penetrate the defenses and drive into German rear zones, and the commander of the Totenkopf's Panzer Regiment was killed in an ambush. Although the cost was high, the action increased Hoth's concern with securing his flanks, and allowed the Steppe Front's reinforcements to reach Prokhorovka before the SS Panzers.

While the II-SS Panzer Korps battled north, the XLVIII was forced to change its axis to the northwest to try and pry Katukov's 1st Tank Army from its line holding the Pena River. The XLVIII finally secured the river line – an objective for the second day of the offensive – seven days into *Zitadelle*. On von Manstein's other flank, the III Panzer Korps attack finally picked up speed, but it would still lag in providing flank protection for the main II-SS Panzer Korps thrust towards Kursk. Worse, Army Group South received news that Model's attack from the north had been canceled. Von Manstein's hopes were now centered on the II-SS Panzer Korps as it closed on Prokhorovka, a village on the direct road to Kursk. By the evening of July 11, an LAH battlegroup led by Joachim Peiper engaged platoons of T-34s from the 2nd Tank Corps and 12 Churchills from the 15th Separate Tank Regiment and took Hill 252.2, 500m from Prokhorovka's outskirts.

As von Manstein's Panzers were engaging Vatutin's tanks, additional forces from Konev's Steppe Front were being rushed to strengthen the defense. By July 11, Rotmistrov's 5th Guards Tank Army completed a 360km road march and was in position to meet the II-SS Panzer Korps' thrust towards Prokhorovka. Thirty-one percent of the 731 Soviet tanks had broken down during the approach, but about half of these were recovered and repaired within 36 hours. The II-SS Panzer Korps' thrust towards Kursk generated intense concern in the Soviet high command, and Vatutin's front commissar, Nikita Khruschev, insisted on an immediate counterattack. As a result, Vatutin ordered Rotmistrov to launch a direct assault against the lead elements of LAH early on July 12. The previously planned staging areas for the attack had been overrun by the German advance the day before, throwing Soviet preparations into confusion, and there was little time to conduct reconnaissance or coordinate artillery or air support. Rotmistrov's two tank corps with 350 tanks would thrust towards Peiper's lead battalion on Hill 252.2, and the other tank corps already engaged were put under 5th Guards Tank Army command, transforming the attack from a concentrated thrust into a series of moves against a variety of objectives spread over a 25km front.

The Soviet armored counterattack force, July 12, 1943

Formation	T-34	T-70	KV-1	Churchill	SU	Total
5 GTA	389	208	1	41	41	680
2 TC	98	63				161
10 TC	97	64			21	182
Total	584	335	1	41	62	1,023

The size of the German force at Prokhorovka was exaggerated in postwar Soviet accounts, but the forces engaged were still considerable. The II-SS

The 5th Guards Tank Army demonstrated the ability of the T-34 to successfully perform long motor marches when dispatched to reinforce the Voronezh Front. About a third of the tanks broke down during the 360km approach to the Prokhorovka area, but many of these were rapidly repaired and returned to their parent units. (Photo by Sovfoto/Universal Images Group via Getty Images)

Panzer Korps had less than 300 tanks operational at this point, with Kempf's III Panzer Korps operating about 200. Rotmistrov's 5th Guards Tank Army controlled a total of five corps during the day, giving a strength of over 1,000 tanks and SPGs. If the 1st Tank Army and XLVIII Panzer Korps are included, roughly 2,000 tanks were involved, with about 570 around Prokhorovka itself. The engagement was not the swirling massed armored clash of legend, however, but a series of meeting engagements with both sides putting in their forces piecemeal. The main action consisted of the Totenkopf, LAH, and Das Reich Divisions with 103, 77, and 95 tanks and assault guns respectively meeting the frontal assault by Rotmistrov's two tank and one mechanized corps. Operations on the flanks were also critical, with Kutuzov's 1st Tank Army occupying the XLVIII Panzer Korps, and additional Soviet tank brigades keeping the III Panzer Korps from intervening in the main German push on Kursk.

The Luftwaffe had failed to detect the approach of the Soviet reserves, and Peiper's troops on Hill 252.2 were shocked to see T-34s of the 29th Tank Corps' 31st and 32nd Tank Brigades carrying paratroopers of the 9th Guards Airborne Division on their decks approaching on July 12. The Soviets overran the hill, destroying four PzKpfw IVs for the loss of 20 tanks. Taking the hill was the last clear Soviet success of the day, however, as Rotmistrov's 29th Tank Corps T-34s and T-70s pushed south and blundered into an unidentified antitank ditch. No engineers were available to prepare a crossing, and the Soviets lost heavily to long-range German fire. To the 29th's right flank, four Tiger tanks led by SS *Untersturmführer* (Lieutenant) Michael Wittmann engaged tanks from the 18th Tank Corps' 170th and 181st Tank Brigades, firing at 1,800m and destroying 20 of 60 T-34s at the cost of one Tiger. Unlike the Soviets, Hoth was able to bring the Luftwaffe to bear, and one of its first strikes wounded the commander of the Churchill-equipped 36th Heavy Tank Regiment. Other uncoordinated Soviet attacks

Soviet troops of the Voronezh Front counterattacking behind T-34 tanks at Prokhorovka, July 12, 1943. Rather than the swirling tank maneuver battle of popular imagination, the Soviet counterattack of July 12 was actually a series of clashes spanning a 25km front. (Mil.ru/ CC-BY-4.0)

followed throughout the day, suffering heavy losses and achieving little. At the end of July 12, the attack had cost the Soviets 359 tanks and SPGs knocked out, although 152 of these were later repaired. The defenders had been able to hit most of the attackers at long range, and although significant numbers of Panzers were likely put out of action, the lead German division, LAH, lost as few as four PzKpfw IVs and one Tiger totally destroyed while halting the main thrust by the 5th Guards Tank Army.

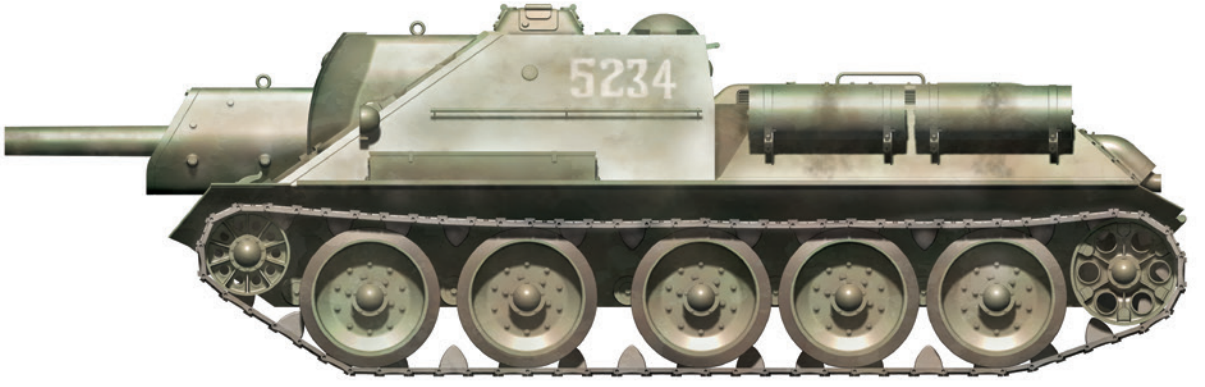
G

MEDIUM AND HEAVY SELF-PROPELLED GUNS

1. SU-122 SPG, 1446th Self-Propelled Artillery Regiment, 5th Guards Tank Army. Efforts to field an SU mounting a 122mm M-30 howitzer on an armored chassis began in April 1942, with experimentation placing the weapon on captured German StuGs and PzKpfw III hulls. Concerns that there would not be enough captured vehicles to guarantee spare parts led to designs placing the gun on a modified T-34 chassis. A total of 638 were manufactured before production concluded in November 1943. The howitzer was fully enclosed behind sloped 45mm armor, but the gun had a limited traverse. The SU-122 entered combat in early 1943, and demonstrated an excellent capability against enemy fortifications, and although its anti-armor performance was limited, it could damage even heavy German tanks at close range through the concussive impact of its large shells. The SU-122s would typically advance 200–600m behind attacking infantry or tanks to lend fire support. The pictured SU-122 was in one of the early SU mixed regiments organized with three batteries of SU-122s and two batteries of SU-76s, giving a final strength of ten of the light and 11 of the medium SPGs. By the summer of 1943, it was clear that the mixed organization led to maintenance and tactical complications, and most SU regiments were soon organized in light (SU-76), medium (SU-122), or heavy (SU-152) configurations. The 1446th lost three SU-76 and eight SU-122 SPGs during the Prokhorovka engagement.

2. SU-152, Bryansk Front. The Soviets recognized the need for heavy armored firepower as early as 1940, when the KV-2 was developed to give front-line units the ability to destroy enemy fortifications such as those that had so frustrated the Red Army when attacking the Mannerheim Line during the Russo-Finnish War. The KV-2 had a huge turret to hold its 152mm howitzer and was only produced in small numbers. By 1942, efforts began to place the ML-20 152mm howitzer on a KV-1S chassis, but this time in an encased fighting compartment similar to the StuG assault guns used by the Wehrmacht. The resulting SU-152 proved to be extremely effective against enemy fortifications and soft targets, and its huge shells could have a devastating effect on enemy tanks, with even the Tiger vulnerable if engaged at shorter ranges. During *Zitadelle*, Soviet sources claimed that numbers of Tigers and Ferdinands were knocked out by SU-152s, leading to the SU being nicknamed *Zveroboi* (animal hunter). Almost 700 SU-152s were produced before production shifted in December 1943 to the improved ISU-152, with the same gun mounted on an IS-2 heavy tank chassis.

1



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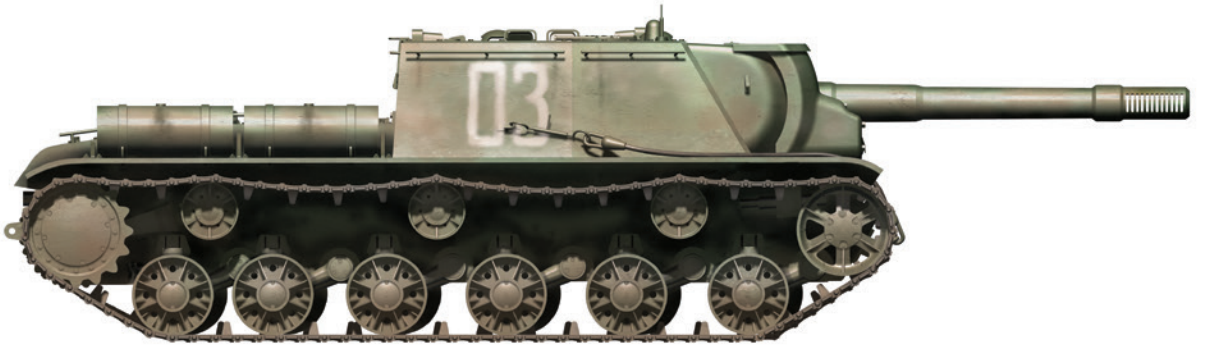

The next day, Hitler called his army group commanders to his *Wolfsschanze* headquarters in East Prussia. Buoyed by the II-SS Panzer Korps advance, von Manstein claimed that Army Group South was on the verge of a breakthrough. Army Group Center's attack had already been halted, however, and the Soviet offensive against the Orel salient was underway. Concerned with the need to reinforce Italy due to the Allied invasion of Sicily on July 10 and potential Soviet threats to other portions of the front, Hitler called a halt to *Zitadelle*. The Führer was intent on transferring the SS divisions to Italy, where he thought their strong political indoctrination would help steady the Italians. Von Manstein had positioned his last reserve, the XXIV Panzer Korps, to exploit the expected breakthrough at Prokhorovka, but Hitler refused to allow it to be committed due to looming Soviet threats to German lines further to the south. Von Manstein was only given permission to tie up the offensive with local operations.

The number of tanks knocked out during the battles around Kursk and particularly during the famous clash at Prokhorovka remains the subject of ongoing research and analysis. In total, the Red Army lost between 1,300 and 1,600 tanks and SUs during the entire Kursk battle, although a portion were recovered and repaired. Although German units reported small numbers of tanks to be totally destroyed, a much larger number were out of action on any given day due to damage from enemy fire, mines, or mechanical breakdowns. Army Group South reported the complete loss of 119 tanks and ten assault guns during the offensive, but on July 15 it had roughly 800 disabled or under repair, leaving only 340 tanks and 156 assault guns operational. German personnel losses, including three Panzer regiment commanders and thousands of Panzergrenadiers and leg infantry, were heavy. Despite its severe losses, the Red Army still had 1,500–1,900 tanks and SUs available to defend Kursk in mid-July.

Despite massive tank losses during the repulse of Operation *Zitadelle*, the Red Army was able to restore its tank armies within a matter of weeks with new tanks and crews and resume the offensive. (Nik Cornish at www.stavka.photos/)

T-34s on the attack. Rather than a classic envelopment, the Soviet Operation *Kutuzov* offensive against Army Group Center degenerated into a grinding series of attacks that slowly pushed Model's defenders out of the Orel salient. (From the fonds of the RGAKFD in Krasnogorsk via Stavka)

Operation *Kutuzov*

The German high command was keenly aware of the vulnerability of the Orel salient. Despite its title, Army Group Center's 2nd Panzer Army defending the northern and eastern portions of the salient controlled only one Panzer and 14 infantry divisions. By July 11, the Soviets decided that Model's 9th Army attack towards Kursk had been sufficiently held and launched Operation *Kutuzov* against the salient the next day. General M. M. Popov's Bryansk Front attacked directly from the east, while General V. D. Sokolovsky's Western Front's 11th Guards Army under General Bagramyan struck from the north. General V. M. Badanov's newly formed 4th Tank Army with 652 tanks and SPGs was available to support Bagramyan, and General Rybalko's 3rd Guards Tank Army with 731 to support Popov.

Both assaults began with an unprecedented artillery barrage, but Popov's main attack was poorly handled and made little initial progress. Popov rapidly committed 300 of his reserve tanks to try and break through, including three regiments with KV-1s, but the German guns of 1943 could now deal with the KV's armor. The 521st antitank company shot the 114th KV-1 regiment to pieces at long range with its 75mm guns firing tungsten penetrator rounds. Popov lost a total of 60 Soviet tanks on the first day. Popov soon committed his exploitation reserve, the 1st Guards Tank Corps, gaining some ground but at heavy cost. Unlike Popov, Bagramyan's attack from the north was able to make an initial breakthrough, and Model began withdrawing his 9th Army back to its *Zitadelle* start line to free Panzer divisions to hold off the offensive to their north.

After a pause for regrouping, Rokossovsky's Central Front was able to join Popov's and Sokolovsky's attacks against Orel, but Zhukov chose to employ steady pressure from all three fronts rather than attempt a more ambitious but riskier pincer strategy to cut off the German salient. Popov committed Rybalko's 3rd Guards Tank Army on July 19 but sent it into frontal assaults along two divergent axes of advance. After a week of combat, Rybalko had lost 669 tanks and his army was withdrawn for rebuilding.

Six days later, the 4th Guards Tank Army and 2nd Guards Cavalry Corps were assigned to Sokolovsky to speed Bagramyan's offensive drive from the north. Model now had eight of the 16 Panzer divisions on the Eastern Front but could not resist the continuous Red Army barrages and assaults, and on July 31 secured Hitler's permission to withdraw to the prepared defenses of the Hagen Line at the base of the salient. Much lesser known than *Zitadelle*, *Kutuzov* had cost Model four times as many losses as the Kursk offensive, including 229 tanks and assault guns. Although an overall success, the Soviet conduct of the operation had been clumsy at the tactical level. The Soviet armor never achieved a true operational breakthrough, and the repeated frontal tank assaults cost the Red Army 2,586 tanks.

Operation *Rumyantsev*

The Soviet high command planned to launch an offensive to retake Kharkov once the German *Zitadelle* offensive was halted, and after two weeks of preparations, Operation *Rumyantsev* was launched on August 3. Vatutin's Voronezh Front attacked south with the rebuilt 5th Guards Tank and 1st Tank Armies, while other Soviet fronts attacked from the east. The offensive was led by Soviet infantry armies controlling tank corps that would be inserted early in the offensive to exploit penetrations of the enemy front lines and deepen the breakthrough. The 1st Tank and 5th Guards Tank Armies were then to drive through the gaps and continue south to exploit. The total Soviet attacking force was almost a million troops and 2,439 tanks and SPGs, facing 210,000 men and about 250 German tanks and assault guns.

The initial attacks made penetrations of up to 22km, and von Manstein, who had expected Soviet forces to need more time to rebuild their tank armies after Prokhorovka, scrambled to assemble forces to meet the attack. The Red Army infantry and artillery could not keep up with the exploiting 5th Guards Tank and 1st Tank Armies, and after an 80km drive, the Soviet

Soviet T-34s preparing for movement. German intelligence was surprised by the speed with which the Red Army replenished its armored force after the repulse of the *Zitadelle* offensive. (From the fonds of the RGAKFD in Krasnogorsk via Stavka)

A British-provided Churchill Mk IV heavy tank passes a knocked out German SdKfz 232 armored car during Operation *Rumyantsev* near Kharkov. The 5th Guards Tank Army's 18th Tank Corps contained the 36th Guards Tank Regiment with a strength of 31 Churchills at the start of the Kursk campaign.

armor struggled to deal with counterattacking German reserves. A complex, three-day clash between the tank armies and von Manstein's counterattacking III Panzer Korps at Bogodukhov temporarily halted the advance, but the weight of the offensive eventually forced Hitler to permit the evacuation of Kharkov on August 23–24. The cost to the tank armies was severe, with the 1st reduced from 646 tanks and SPGs to 120, and the 5th Guards from 503 to 50. It would take two months for Rotmistrov's 5th Guards Tank Army to be once again ready for operations. German forces were similarly reduced, and few replacements were reaching the front-line units. The USSR began a cascading series of offensives up and down the front that soon drove German forces to begin a strategic retreat to the Dnieper River.

AFTERMATH

By the end of the year, Soviet forces had driven Army Group South back to the Dnieper, seized several bridgeheads over the river, and retaken Kiev. These victories were costly, with Vatutin's and Konev's Fronts, now renamed the 1st Ukrainian and 2nd Ukrainian, losing roughly 12,000 tanks from July to December. Red Army forces now almost always controlled the battlefield, however, and with improved repair and recovery capabilities returned about 7,000 of these to the front, while 10,162 new tanks arrived from the factories. The Germans lost about 2,800 tanks and 850 assault guns during the same period, and as they rarely retained control of the battlefields were less able to recover and repair disabled tanks. The *Ostheer* had 2,053 tanks on the Eastern Front at the end of the year, but only about half were operational. German units could still inflict heavy losses on attacking Soviet armor, especially when able to engage them with long-range fire, but while German accounts from the post-Kursk era stress tactical successes, they could no longer achieve operational results on the level of von Manstein's "backhand

Soviet tanks and infantry on the attack near Belgorod, August 1943. The Soviets were able to rebuild their 5th Guards Tank and 1st Tank Armies more quickly than the Germans expected, and rapidly captured Belgorod when they launched Operation *Rumyantsev* in August. Army Group South was able to gather Panzer reserves, however, checking the exploitation by the Red Army tank armies. (Photo by Universal History Archive/ Universal Images Group via Getty Images)

blow" counterattack against Soviet spearheads in the early months of 1943. By December 1943, the back of the Wehrmacht's Panzer force in the east had been broken and Ukraine regained by the Red Army, all during a period where the Soviet KVs and T-34s were increasingly outmatched by Germany's improved tanks. The Red Army would now launch a series of steady offensives using massive attacks by artillery-supported infantry armies to break through German defenses, followed by exploiting tank corps and armies driving deep into enemy territory. The Red Army's tank forces would be joined by up-gunned T-34/85s and IS-2 heavy tanks better able to handle its opponents in 1944.

BATTLE ANALYSIS

Tactically, German Panzer units continued to inflict disproportionate losses on the Red Army at Kursk, using their superior training and experienced personnel to outmaneuver and outshoot their foes. In favorable tactical situations, the Tigers, Ferdinands, and, when not broken down, Panthers could destroy large numbers of T-34s at long range – over 1,000m – where they were almost invulnerable. The number of the new German tanks was small, however, and due to their complexity and expense, they would remain heavily outnumbered by Soviet and Allied tank production. Only 1,354 Tigers left German factories, and although the Panther design matured into arguably the most effective tank of the war, a total of 5,976 were produced, the equal of three months of Soviet tank and SPG production.

The Red Army's tank force emerged victorious in the summer of 1943 despite major challenges. The Soviets continued to use the obsolete T-60 and T-70 tanks in large numbers, and German tanks now technically matched or exceeded the 76mm-armed T-34s as well as many of the Lend-Lease models employed at Kursk. By the summer of 1943, the Soviets had developed war-winning doctrine and organizations – tank corps and armies – but at Kursk and Orel inexperience and command pressures led front commanders to prematurely commit their tank reserves and repeatedly order costly and ineffective frontal attacks. The hasty attack by the 5th Guards Tank Army on July 12 was particularly marred by poor reconnaissance and a lack of artillery and air support, costing hundreds of Soviet tanks and crews.

T-34s and infantry at Kursk. Soviet tactical deficiencies led to heavy losses during the battle, but the USSR's ample reserves allowed the Red Army to ultimately force Army Group Center to withdraw to the Dnieper River. (Photo by Sovfoto/Universal Images Group via Getty Images)

While the USSR's ability to effectively employ its tank corps and armies was still maturing, its ability to rapidly replenish armored losses and keep up the pressure on the Wehrmacht proved decisive. Kutukov's 1st Tank Army consisted of 563 tanks and self-propelled guns on July 5, but the intensive defensive fighting in the salient cost it 70 percent of its strength. By August 3, Kutukov's army had been rebuilt to a strength of 542 tanks and SPGs to join in Operation *Rumyantsev*. The new crews had only rudimentary training, but by this stage of the war numbers of experienced crews and leaders helped the rebuilt units operate more effectively. By early 1944, Soviet front commanders were more adept at employing their tank corps and armies to drive deep into German defenses, and numbers of improved Soviet designs arrived to make their armored vehicles better able to engage their German counterparts, including T-34/85s, SU-85s, and the IS-2 heavy tank. The USSR would continue to lose many more tanks than its German opponents throughout the last years of the war, but by then the Red Army had the tanks, organization, and doctrine to engage in a series of major offensives that would ultimately regain all Soviet territory and drive through Eastern Europe into the heart of Germany.

A Tiger maneuvering past a burning T-34. The large number of effective German long 75mm tank and antitank guns, along with lesser numbers of 88mms on Tigers and antiaircraft mounts, allowed German forces to inflict heavy losses on attacking Soviet armored units. (Photo by Presse-Illustr. Hoffmann/ullstein bild via Getty Images)

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